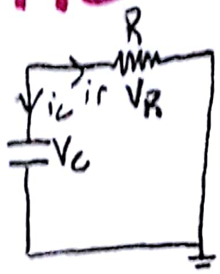
RC



$$V_C(t) = V_0 \cdot \exp(-t/\tau)$$

$$i_R(t) = -i_C(t) = \frac{V_0}{R} \cdot \exp(-t/\tau)$$

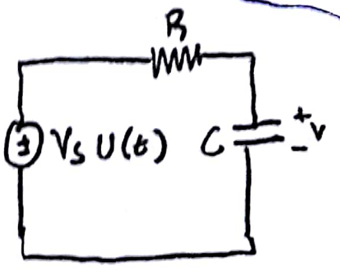
$$P_r = \frac{V_0^2}{R} \cdot \exp(-2t/\tau)$$

$$W(t) = \int_0^t P_r(t)\,dt = \frac{C \cdot V_0^2}{2} \cdot \left[1 - \exp(-t/\tau)\right]$$

$$i_C(t) = C \cdot \frac{dV(t)}{dt}$$

$$E_C = \frac{1}{2} C V^2$$

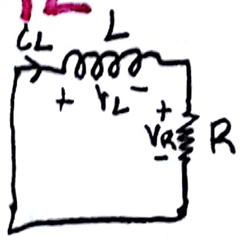
$$\tau = RC$$



$$V(t) = V(\infty) + [V(0) - V(\infty)] \cdot \exp(-t/\tau)$$

$$\tau = RC$$

RL



$$i_L(t) = i_0 \cdot \exp(-t/\tau)$$

$$V_L(t) = L \cdot \frac{di(t)}{dt}$$

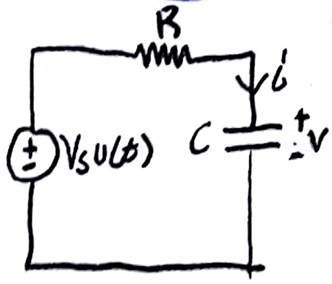
$$V_R(t) = -V_L(t) = R \cdot i_0 \cdot \exp(-t/\tau)$$

$$E_L = \frac{1}{2} L i^2$$

$$P_r(t) = R \cdot i_0^2 \exp(-t/\tau)$$

$$\tau = \frac{L}{R}$$

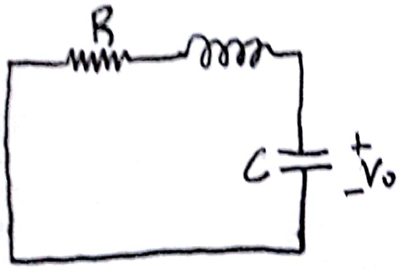
$$W(t) = \int P_r(t)\,dt = \frac{L \cdot i^2}{2} \cdot \left[1 - \exp(-2t/\tau)\right]$$



$$i(t) = i(\infty) + (i(0) - i(\infty)) \cdot \exp(-t/\tau)$$

$$\tau = \frac{L}{R}$$

Seri RLC (Doğal)



$\alpha = \frac{R}{2L}$, $w_0 = \frac{1}{\sqrt{LC}}$

$s_{1/2} = -\alpha \pm \sqrt{\alpha^2 - w_0^2}$

$\alpha > w_0$

$i(t) = A_1 \cdot e^{s_1 t} + A_2 \cdot e^{s_2 t} \longrightarrow$ Aşırı Sönümlü / Overdamped

$\alpha = w_0$

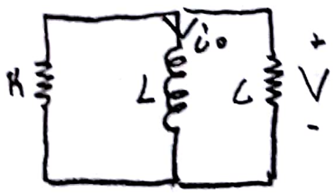
$i(t) = (A_1 t + A_2) e^{-\alpha t} \longrightarrow$ Kritik Sönümlü / Critically Damped

$\alpha < w_0$

$i(t) = e^{-\alpha t} \cdot [B_1 \cdot \cos w_d t + B_2 \cdot \sin w_d t] \longrightarrow$ Eksili Sönümlü

$w_d = \sqrt{w_0^2 - \alpha^2}$

Paralel RLC (Doğal)



$\alpha = \frac{1}{2RC}$, $w_0 = \frac{1}{\sqrt{LC}}$

$s_{1/2} = -\alpha \mp \sqrt{\alpha^2 - w_0^2}$

$\alpha < w_0$

$V(t) = e^{-\alpha t}\left[B_1 \cdot \cos w_d t + B_2 \cdot \sin w_d t\right]$

$w_d = \sqrt{w_0^2 - \alpha^2}$

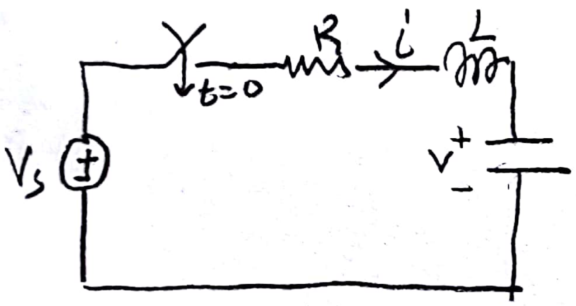
$\alpha = w_0$

$V(t) = (A_1 t + A_2) \cdot e^{-\alpha t}$

$\alpha > w_0$

$V(t) = A_1 \cdot e^{s_1 t} + A_2 \cdot e^{s_2 t}$

Seri RLC (Basamak)



$$\alpha = \frac{R}{2L} , \quad w_0 = \frac{1}{\sqrt{LC}}$$

$$S_{1/2} = -\alpha \pm \sqrt{\alpha^2 - w_0^2}$$

$\alpha > w_0$

$$V(t) = V_s + A_1 \cdot e^{s_1 t} + A_2 \cdot e^{s_2 t}$$

$\alpha = w_0$

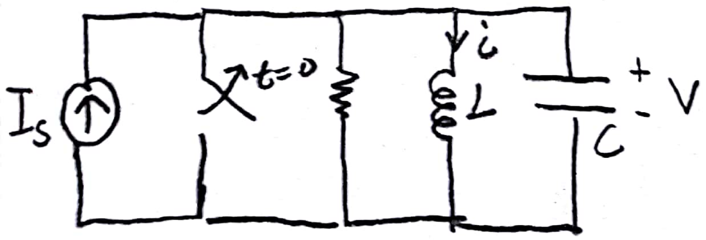
$$V(t) = V_s + (A_1 t + A_2) \cdot e^{-\alpha t}$$

$\alpha < w_0$

$$V(t) = V_s + [B_1 \cdot \cos w_d t + B_2 \cdot \sin w_d t] \cdot e^{-\alpha t}$$

$$w_d = \sqrt{w_0^2 - \alpha^2}$$

Paralel RLC (Basamak)



$$\alpha = \frac{1}{2RC} \quad , \quad w_0 = \frac{1}{\sqrt{LC}}$$

$$S_{1/2} = -\alpha \pm \sqrt{\alpha^2 - w_0^2}$$

$\alpha > w_0$

$$i(t) = i_s + A_1 \cdot e^{S_1 t} + A_2 \cdot e^{S_2 t}$$

$\alpha = w_0$

$$i(t) = i_s + (A_1 t + A_2) \cdot e^{-\alpha t}$$

$\alpha < w_0$

$$i(t) = i_s + \left[B_1 \cdot \cos w_d t + B_2 \cdot \sin w_d t \right] \cdot e^{-\alpha t}$$

$$w_d = \sqrt{w_0^2 - \alpha^2}$$